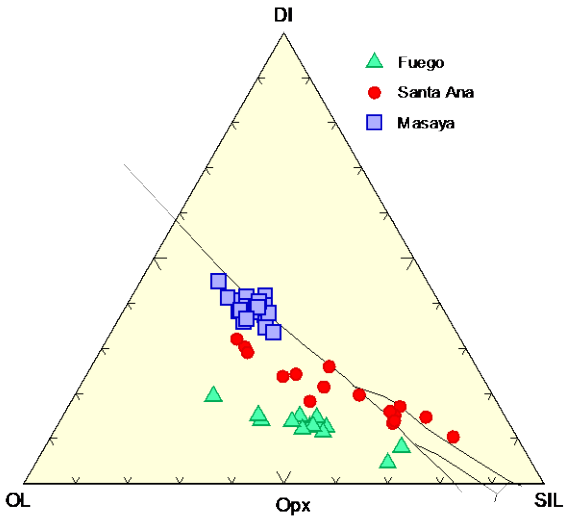
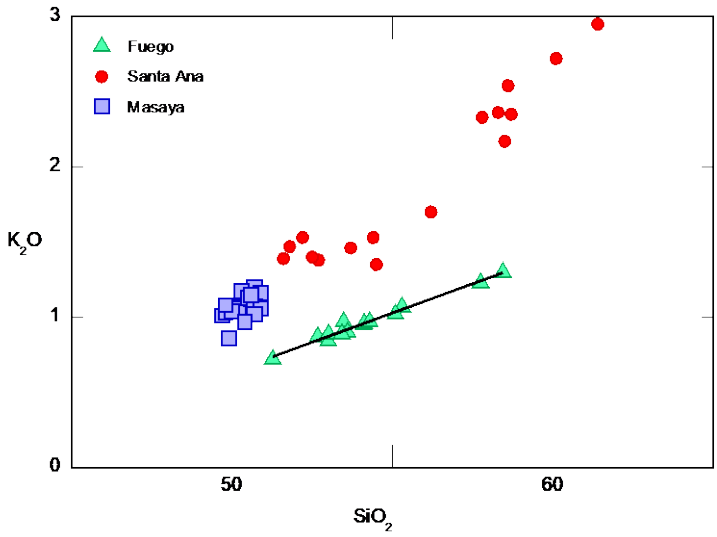
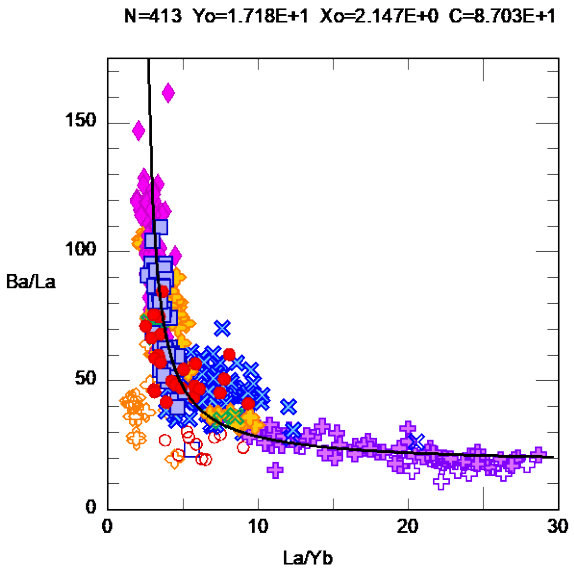
An Igpet Gallery

July 4, 2014

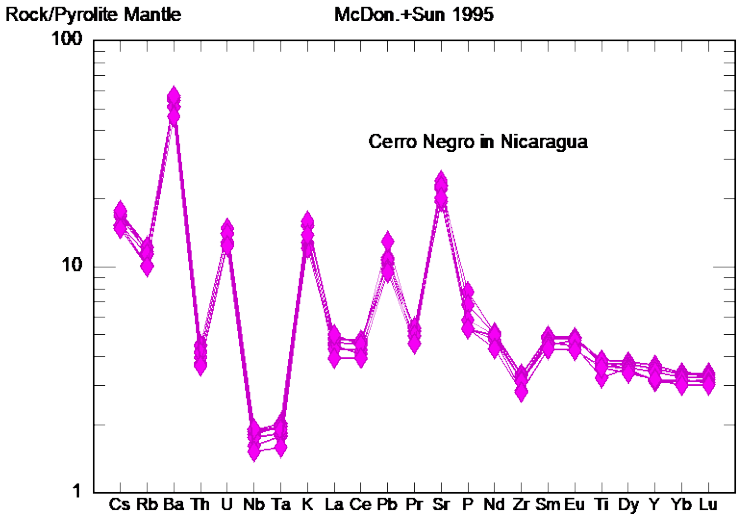




Regression lines are sometimes informative and colored backgrounds can be either soothing or distracting., depending on one's mood. A toggle button switches background color on and off

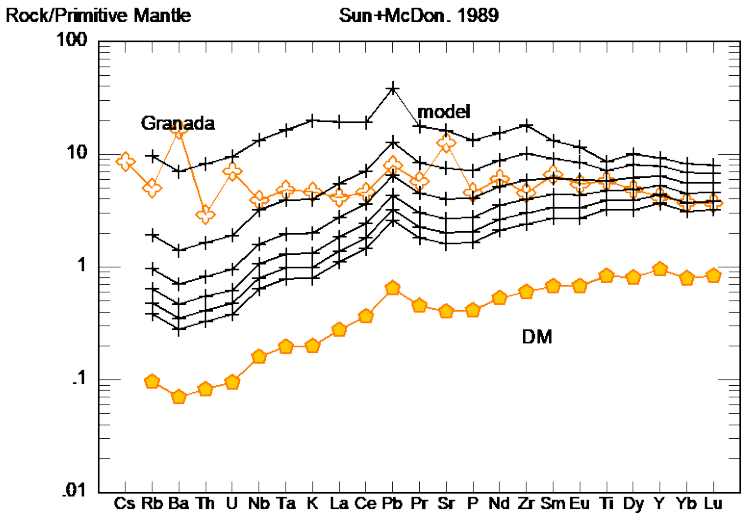


One of Igpet's functions is fitting a regression hyperbola (a mixing curve) in ratio versus ratio plots. Reasonable fits, like the one above, indicate that mixing is not ruled out. The top line can be toggled on/off by the NB (nota bene) button.

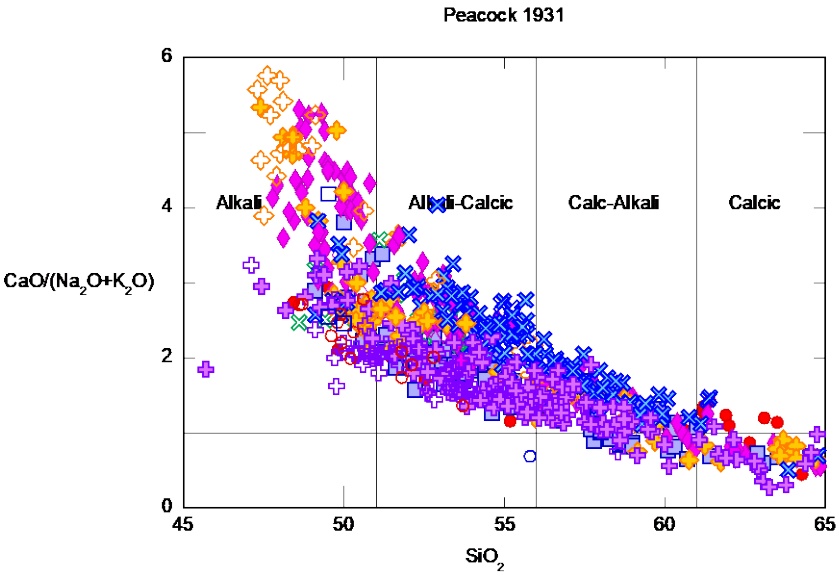


Every geochemist likes spider plots, perhaps because the Log scale of the Y axis hides a lot of noise and failure to fit. However this data set is high quality and has limited range of variation.

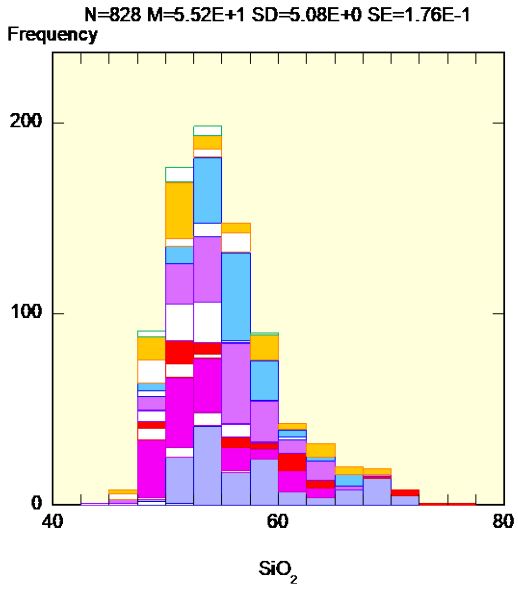
This spiderplot for just Cerro Negro was made from the same datafile as the La/Yb versus Ba/La diagram above it. Igpet's SubSelect menu is a powerful tool for filtering large datafiles to get to what you want. It obviates the need for numerous small datafiles.

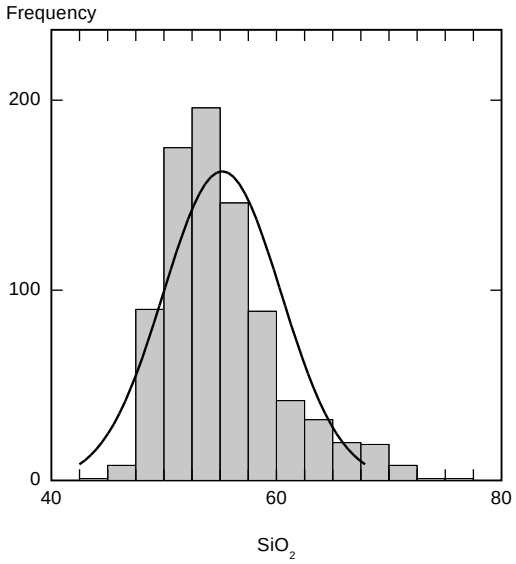


One cannot make the Granada lava by melting just a depleted mantle. Other components are needed. The strongest part of Igpet is multi-element modeling based on Spider plots. Models available include batch melting, aggregated fractional melting, AFC, FC, etc. The models (+'s) remain in memory and will plot in XY plots

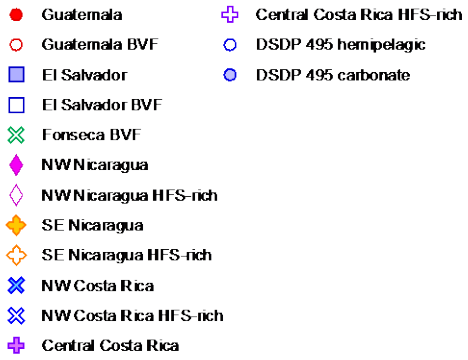


The origin of the term, calc-alkaline. Where the data array crosses the horizontal line at 1.0 identifies the field. The data here, the Central American volcanic front, define a calc-alkaline assemblage. Peacock's original diagram was different but this one is easier to plot.

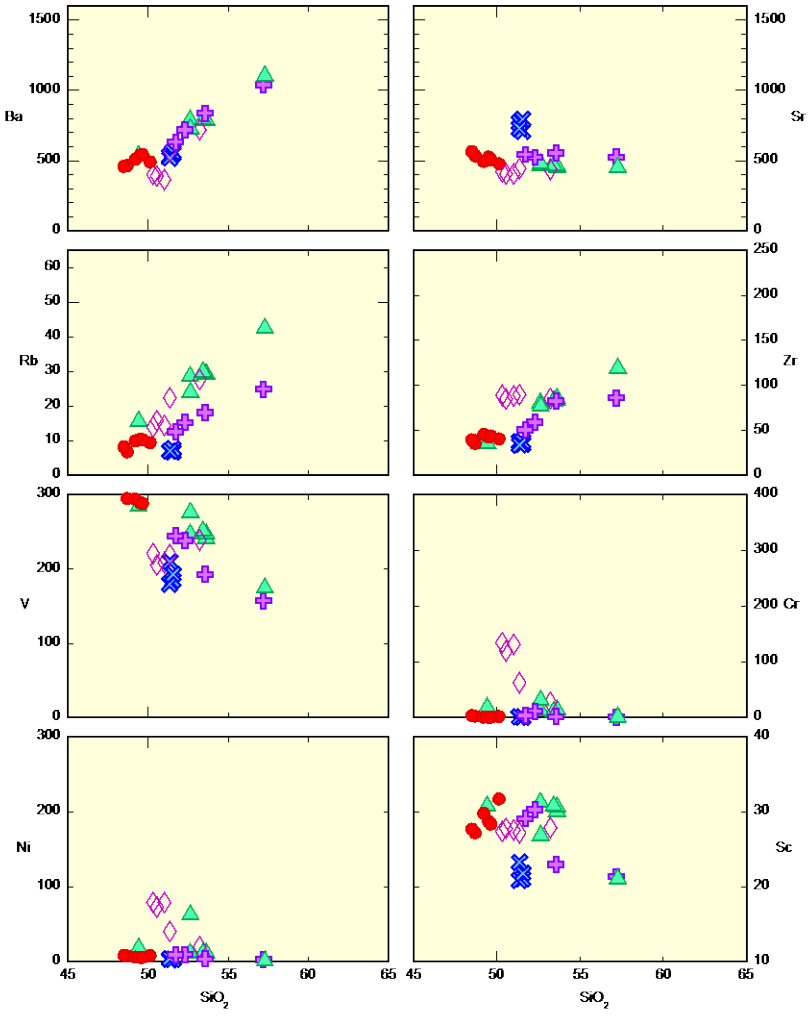




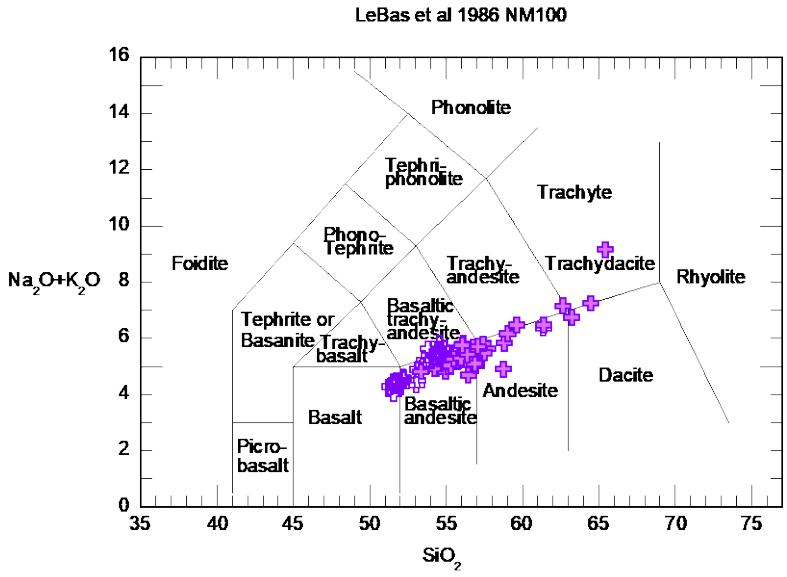
The distribution of SiO_2 in Central American volcanics is not normal. The histogram on the left has sub-boxes for all the different groups that have different symbols. It also has some statistics. The same data make a more publication friendly image when plotted using the same symbol for all function (using #32, a grey cross). The fitted normal curve is obviously not a "good" fit.



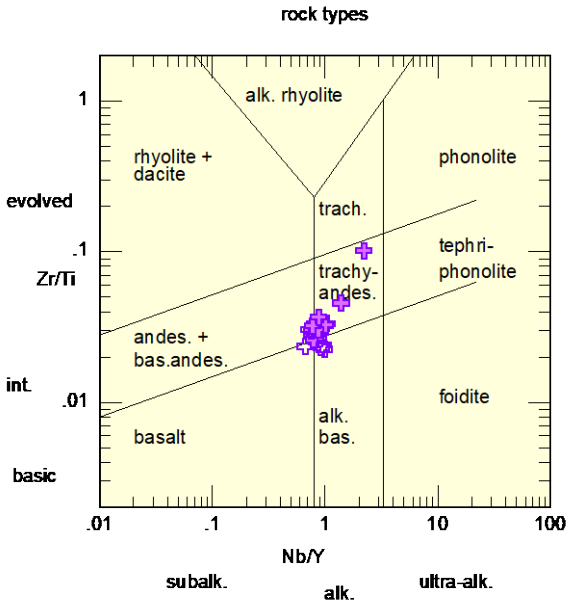
Igpet generates a separate legend for diagrams/files with too many symbols, like the Central American volcanic front file displayed in the previous six diagrams.



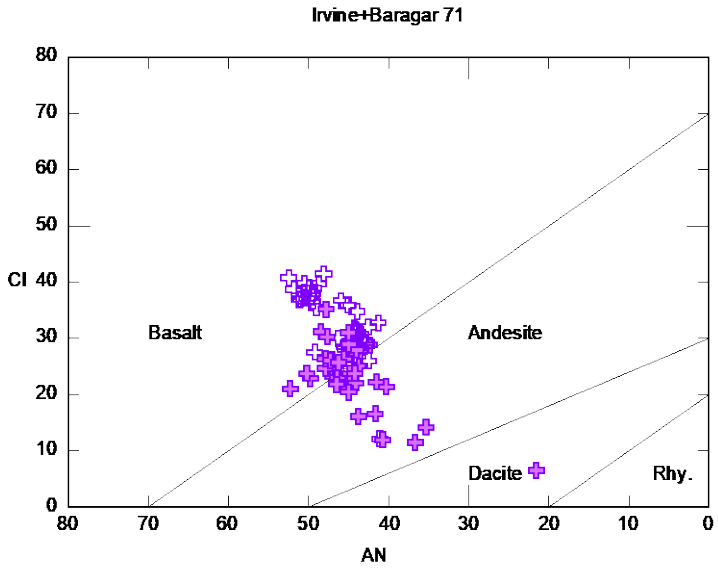
This set of Harker diagrams for Telica volcano was made with eight preset rectangles. Not a very attractive diagram because the X-axis is too broad. It is included here just to show an Igpet capability. The X and Y axes can be adjusted in the file Harker2.txt.



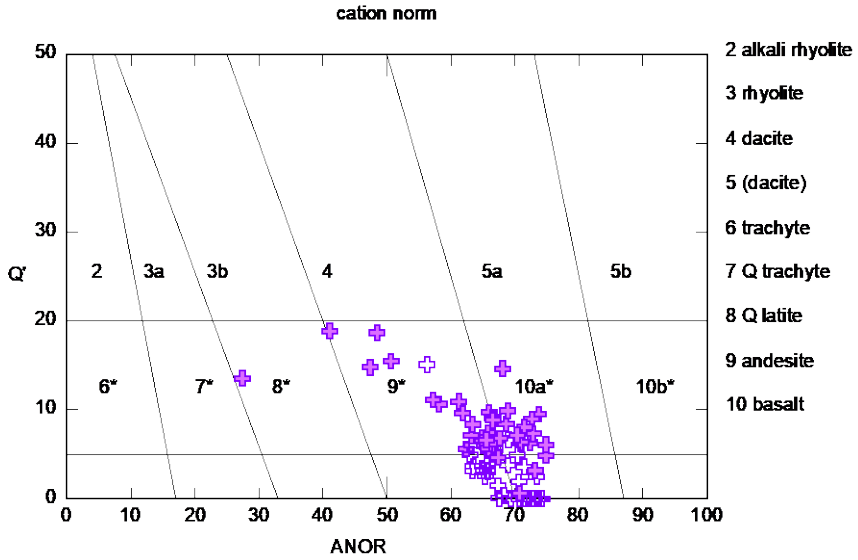
Many tectonic identification and rock nomenclature plots are included in Igpet. Note the funny item "NM100". This means that the analyses were normalized to 100% prior to plotting, AS SPECIFIED BY THE CREATORS OF THE DIAGRAM! The line of text just above the diagram is easily removed using the NB on/off toggle button. Data are from Irazú volcano in Costa Rica.



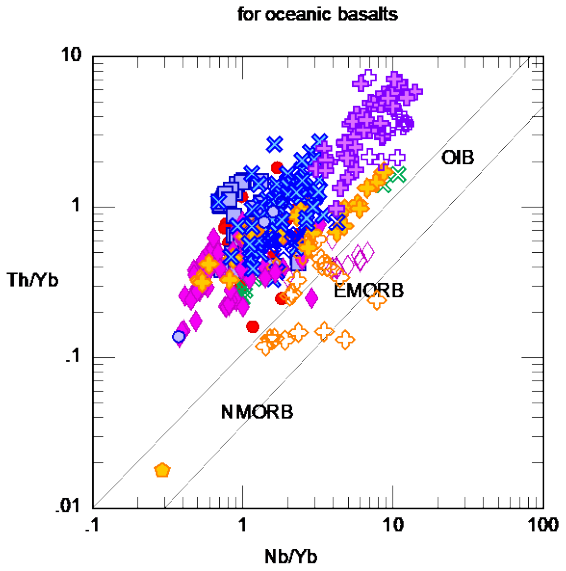
According to this method, even the basalts at Irazú are mostly trachyandesites



This diagram works better and accurately finds the basalts at Irazú.

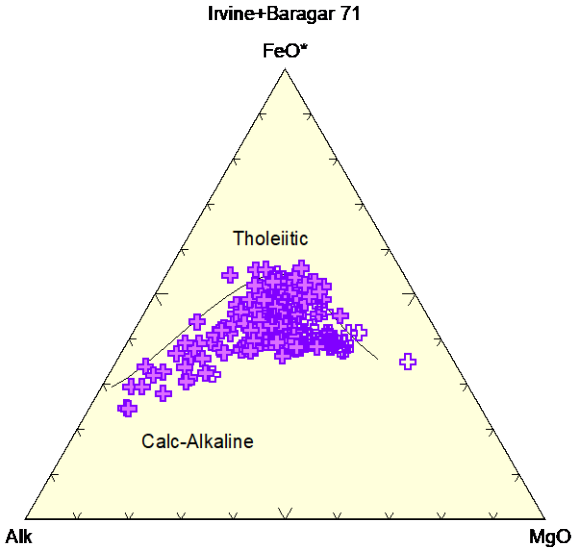


The IUGS “official” classification names the rocks at Irazú as the Costa Rican geologists do and finds mostly basalts and andesites.

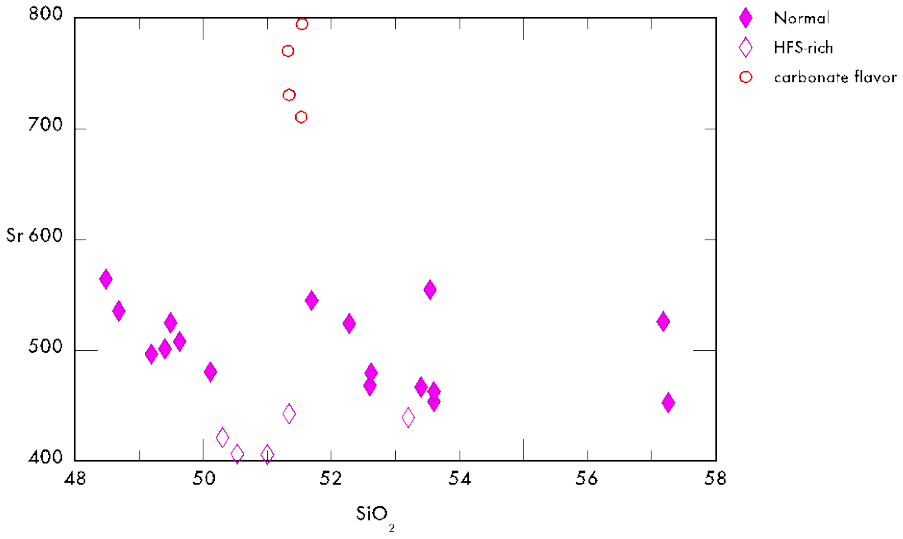


The Central American data are shifted to lower Nb contents and do NOT plot in the fields of Oceanic basalts. This is one way to show the well-known Nb depletion in arc magmas. Many of the open symbols for Nicaragua plot in the Oceanic field and were recognized as odd many years ago when their robust TiO_2 contents earned them the sobriquet "High Ti" basalts. This was a misnomer because the TiO_2 contents were only high relative to the greatly depleted magmas found at arcs. These are arc magmas that are mildly enriched Ba, Sr and Pb and have a bit of ^{10}Be. They lack HFS depletion. What are they doing in Nicaragua?

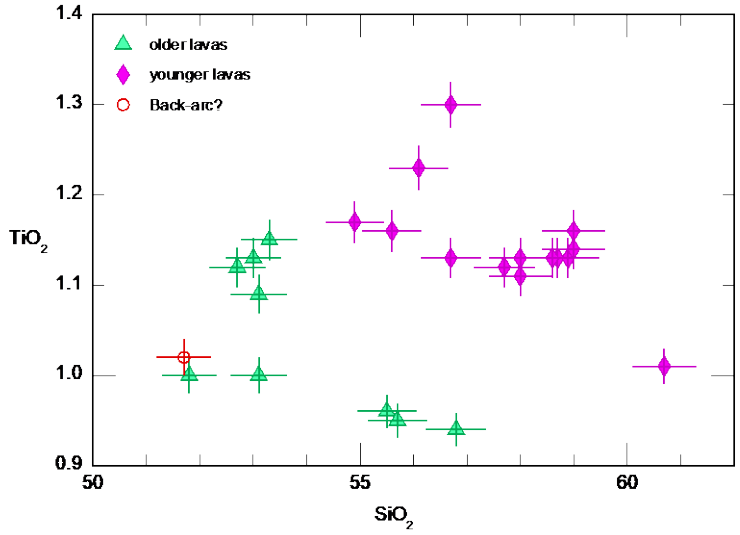
The yellow pentagon is a DM (depleted mantle) estimate.



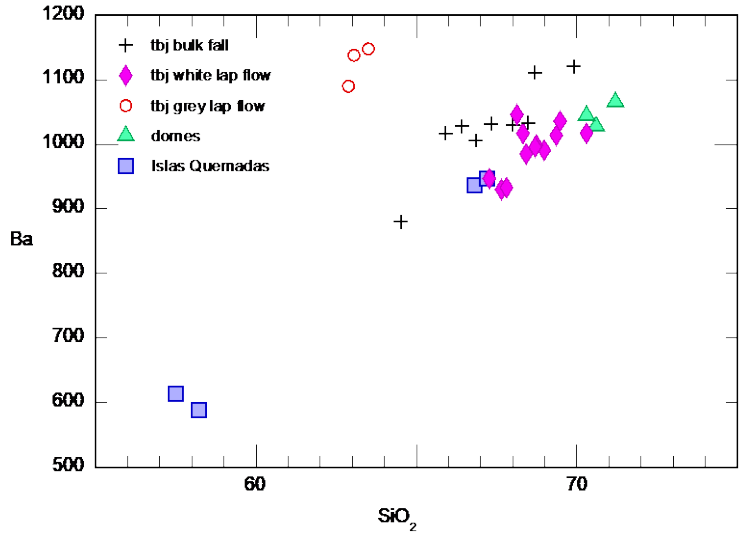
The Costa Rican lavas, as shown above, are indeed Calc-alkaline.



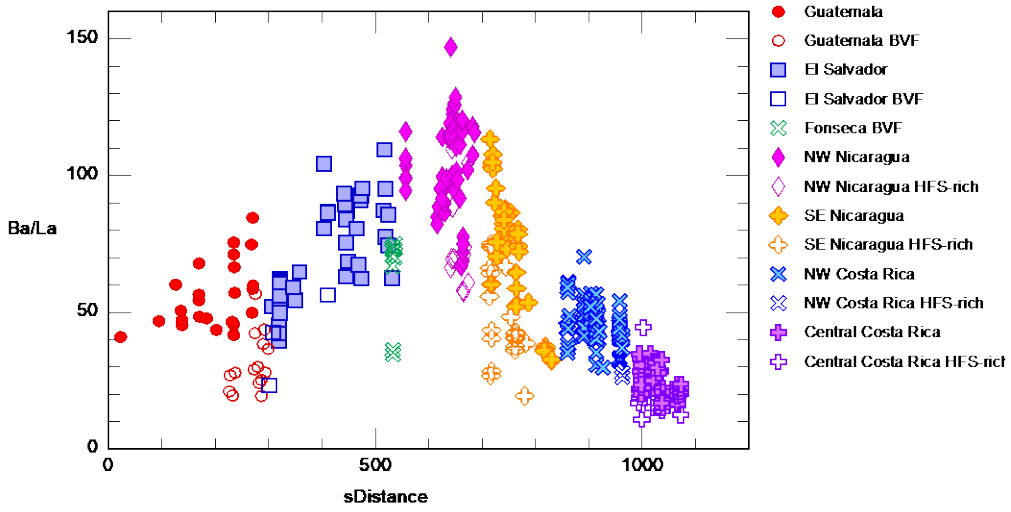
Many volcanoes have distinctly different magmas erupting. This example is Telica in Nicaragua. I changed the font to Futura just to show that the fonts can be changed. All the other diagrams use Arial.



Igpet allows error bars. For each element you add a column called “error” right after the column of element values(or oxide or isotope ratio etc). Put the errors in this column and you get a plot like the one above. The errors shown here for Boqueron volcano are estimates. SiO_2 is 1.0%, so a value of 53 gets an error of 0.53. For TiO_2 the error estimate was 2.0%.



It is always a good idea to separate identifiable subunits using symbols. The pyroclastic flow from the Ilopango caldera that erupted about 400 AD had two populations of pumice lapilli, white and grey. The fall deposit from the eruption, called Tierra Blanca Joven (tbj), was the result of a hydromagmatic eruption that turned whatever pumice was present into fine particles. Analyses of bulk fall deposit lie between the two populations of pumice lapilli.



Finally, here is one of my favorite ideas, plotting geochemistry against physical or tectonic parameters. This is Ba/La against distance along the volcanic front of Central America. It needs to be spiffed up in Ai.

Quadratic and cubic polynomial regressions are now included in Igpet (June 2014). In the case below there is no logical reason to fit the data with a cubic regression. I include this plot just to make the point that having this capability and using it wisely require statistical knowledge and understanding of geochemical modeling that is not included in Igpet. In other words, don't just blindly do stuff!